SECTION 04510

MASONRY RESTORATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included: Repair and restoration of exterior masonry walls, where shown on the drawings and elsewhere as required.

1.02 RELATED SECTIONS

A. Section 079200 – Sealants and Caulking

B. Section 09830 – Elastomeric Wall Coating

C. Section 09870 – Urethane Painting

1.03 REFERENCES

A. American Society for Testing and Materials (ASTM).

B. Brick Institute of America (BIA).

1.03 SUBMITTALS

A. As provided in Section 1330 and 01340 and as required by the consultant.

B. Product Data: Submit manufacturer's technical data for each product, including recommendations for product application, installation, and use. .

C. Samples for Initial Selection: Provide on-site in-place sample or "mock-up", minimum 3 feet by 3 feet in dimension, depicting cleaned masonry surface, mortar crack repairs, and application of clear sealer, if required.

D. Product Certificates: Signed by manufacturers of joint sealants certifying that products furnished comply with requirements and are suitable for the use indicated.

E. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

F. Preconstruction Field Test Reports: Submit manufacturer's written Material Safety Data Sheet (MSDS) for each material used in this Section.

G. Submit sample of brick masonry unit to be used for brick replacement units. Sample to show dimension, color, texture, and appearance.

H. Warranties: Special warranties specified in this Section.

1.04 QUALITY ASSURANCE

A. As provided in Section 01450 and the GENERAL CONDITIONS OF THE CONTRACT.

B. Qualifications of Manufacturer

1. Products used in the work included in this section shall be produced by manufacturers regularly engaged in the manufacturing of similar items and with a history of successful production and product installations.

C. Qualifications of Installers

1. Installers shall be thoroughly trained and experienced in the necessary crafts. Installers shall be made familiar with any unique requirements specified for proper performance of the work in this section. Only professional waterproofing contractors shall perform this work.

D. Rejection

1. In the acceptance or rejection of work under this section, no allowance will be made for lack of skill or specification understanding on the part of the workmen. It shall be incumbent upon the contractor to use adequate numbers of skilled installers and to instruct them in the requirements of the project specifications as well as maintaining a set of the project specifications and drawings on the roof at all times

E. Replacement

1. In the event inadequate or improper installation is determined, contractor shall make all repairs and replacements required to render the installation compliant with the project specifications. Replacements, due to improper performance shall be at the sole cost of the contractor

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Coordinate delivery with City.

B. Deliver materials to site in manufacturer's original unopened containers and packaging, bearing labels including manufacturer's name, product name, type of material, batch number, date of manufacture, shelf life, and instructions for use.

C. Carefully pack, handle, and ship masonry units and accessories strapped together in suitable packs or pallets or in heavy cartons. Unload and handle to prevent chipping and breakage.

D. Protect masonry restoration materials during storage and construction from wetting by rain, snow, or ground water and from staining or intermixture with earth or other types of materials.

E. Protect grout, mortar, and other materials from deterioration by moisture and temperature. Store in dry location or in waterproof containers. Keep containers tightly closed and away from open flames. Protect liquid components from freezing. Comply with manufacturer's recommendations for minimum and maximum temperature requirements for storage and installation.

F. Remove damaged, deteriorated, or out-of-date material from site.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Work shall not commence during inclement weather.

B. Work shall not commence on a day when precipitation is imminent or probable.

D. Protect persons, motor vehicles, and surfaces around masonry being restored, building site, and surrounding buildings from injury, contamination, soiling, and damage resulting from masonry work.

D. Prevent chemical solutions from coming into contact with pedestrians, motor vehicles, landscaping, adjacent buildings, and other surfaces which could be damaged by contact.

E. Do not clean masonry during winds of sufficient force to spread cleaning solutions to unprotected surfaces.

F. Dispose of runoff from cleaning operations by legal means and in manner to prevent soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.

G. Furnish and erect temporary protection covers over pedestrian walkways and at points of entrance and exit for persons and for vehicles which must remain in operation during course of masonry restoration work.

H. Work masonry surfaces only when air temperatures are 40 degrees Fahrenheit (4 degrees Celsius) and above and will remain so at least seven days after masonry work and until masonry has dried out.

I. Do not repair or install mortar joints or repair masonry unless air temperatures are between 40 degrees Fahrenheit (4 degrees Celsius) and 80 degrees Fahrenheit (27 degrees Celsius) and will remain so for forty-eight hours minimum after repair.

J. Prevent grout or mortar used in repair work from staining face of surrounding masonry and other surfaces. Remove grout and mortar in contact with exposed masonry and other surfaces immediately.

K. Protect sills, ledges, and projections from mortar droppings.

1.07 SEQUENCING AND SCHEDULING

A. Perform masonry restoration work in following sequence:

1. Rake out and remove existing mortar from joints in preparation for new materials.

2. Remove and reset loose brick masonry.

3. Rout out and seal masonry cracks to be repaired.

4. Clean existing masonry surfaces.

1.08 WARRANTY

A. General Warranty: Special warranties specified in this Article shall not deprive the City of other rights the City may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Special Installer's Warranty: Written warranty, signed by Installer agreeing to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MORTAR MATERIALS

A. Portland Cement:

1. ASTM C 150, Type I.

2. Provide non-staining Portland cement complying with staining requirement of ASTM C 91 for not more than 0.03 percent water soluble alkali for stonework and other masonry.

B. Hydrated Lime: ASTM C 207, Type S.

C. Aggregate for Mortar: ASTM C 144.

D. Water: Clean, free of oil, acids, alkalis, and organic matter.

2.02 MASONRY UNITS

A. Units to match existing in shape, size, color, texture, and material; ASTM C216, Grade SW.

B Building Brick: Provide building brick complying with ASTM C 62 of same vertical dimension as face brick for masonry work concealed from view.

C. Colored Mortar Aggregate:

1. Natural or manufactured, hand selected to produce mortar color.

2. Provide sand with rounded edges for pointing mortar.

3. Match size, texture, and gradation of existing mortar as closely as possible.

D. Colored Mortar Pigment:

1. Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes.

2. Use only pigments with record of satisfactory performance in masonry mortars.

2.03 CLEANING MATERIALS AND EQUIPMENT

A. Water for Cleaning: Clean, potable, free of oils, acids, alkalis, salts, and organic matter.

B. Warm Water: Heat water to temperature of 140 degrees Fahrenheit to 180 degrees

Fahrenheit (60 degrees Celsius to 82 degrees Celsius).

C. Brushes: Fiber bristle only.

D. Cleaning Products:

1. "Sertec", Sermac, a Division of Service Master Industries, Inc.

2. "Sure Klean Restoration Cleaner", ProSoCo, Inc.

3. Or approved equal.

2.04 MORTAR MIXES

A. Measurement and Mixing:

1. Measure cementitious and aggregate materials in dry condition by volume or equivalent weight.

2. Do not measure by shovel; use known measure.

3. Mix materials in clean mechanical batch mixer.

B. Mixing Repair Mortar:

1. Thoroughly mix cementitious and aggregate materials together before adding water.

2. Mix again adding only enough water to produce damp, unworkable mix which will retain its form when pressed into ball.

3. Maintain mortar in this dampened condition for one to two hours.

4. Add remaining water in small portions until mortar of desired consistency is reached.

5. Use mortar within thirty minutes of final mixing.

6. Do not re-temper or use partially hardened material.

C. Admixtures: Do not use admixtures in mortar.

D. Mortar Proportions, Repair Mortar for Brick: One part Portland cement, one part lime, and four and one-half to six parts mortar aggregate.

E. Colored Mortar:

1. Produce mortar of color required with selected ingredients.

2. Do not adjust proportions without Consultant's acceptance.

F. Color Pigmented Mortar: Do not exceed pigment-to-cement ratio of 1-to-10 by weight.

G. Mortar Proportions:

1. Pointing Mortar for Brick:
   a. One part white Portland cement, two parts lime, and six parts colored mortar aggregate.
   b. Add colored mortar pigment to produce mortar colors.

2.05 OTHER MATERIALS

A. All other materials not specifically described but required for complete and proper masonry renovations shall be first quality of their respective kinds, new, and as selected by the contractor subject to the approval of the City.

PART 3 - EXECUTION

3.01 GENERAL

A. Examine the areas and conditions under which work of this section will be performed. Correct conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Comply with recommendations of manufacturers for protecting building surfaces and for installation procedures.

B. Protect glass, unpainted metal trim, and stone from contact with acidic chemical cleaners or mortar by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape. Apply masking agent in accordance with manufacturer's recommendations. Do not apply liquid masking agent to painted or porous surfaces.

C. Protect unpainted metal from contact with alkali chemical cleaners by covering metal with either liquid strippable masking agent or polyethylene film and waterproof masking

tape.

3.03 CLEANING EXISTING MASONRY

A. Clean masonry in preparation for application of water repellent sealer.

B. Determine method of cleaning based upon adjoining materials, site conditions, and manufacturer's requirements.

C. Use water blasting or hand method to clean substrate and open pores.

D. Verify surfaces to be restored are clean, free of efflorescence, stains, mildew, grime, dirt, tar, oil, grease, or other foreign matter and discoloration detrimental to application.

3.04 CLEANING EXISTING MASONRY

A. Cleaning:

1. Proceed with cleaning in an orderly manner; work from top to bottom and from one end of each elevation to the other.

2. Determine method of cleaning based upon adjoining materials, site conditions, and manufacturer’s requirements.

3. Use water blasting, sandblasting, or hand method which will clean substrate and open pores.

4. Metal surfaces may be cleaned by Commercial Blast Cleaning (SSPC-SP6), by hand or power tool cleaning (SP2-SP3), or as required to accept primer. Determine method of cleaning based upon adjoining materials, site conditions, and manufacturer’s requirements.

5. Verify surfaces to receive waterproof coatings are clean, free of efflorescence, stains, mildew, grime, dirt, tar, oil, grease, or other foreign matter and/or discoloration detrimental to application.

6. Perform each cleaning method indicated in a manner which results in uniform coverage of all surfaces, including corners, moldings, interstices and which produces an even effect without streaking or damage to masonry surfaces.

7. Rinse off chemical residue and soil by working upwards from bottom to top of each treated area.

B. Water Cleaning Methods:

1. Spray Applications: Spray-apply water to masonry surfaces to comply with requirements indicated for location, purpose, water temperature, pressure, volume, and equipment. Unless otherwise indicated, hold spray nozzle not less than 6-inches from surface of masonry and apply water from side to side in overlapping bands to produce uniform coverage and an even effect.

2. Low Pressure Spray: 100 to 400 psi; three to six gallons per minute.

3. Medium Pressure Spray: 400 to 800 psi; three to six gallons per minute.

4. High Pressure Spray: 800 to 1200 psi; three to six gallons per minute.

C. Chemical Cleaner Application Methods:

1. Apply chemical cleaners to masonry surfaces to comply with chemical manufacturer's recommendations using brush or spray application methods, at Contractor's option, unless otherwise indicated. Do not allow chemicals to remain on surface for periods longer than that indicated or recommended by manufacturer.

2. Spray Application; Apply to pressures not exceeding 50 psi, unless otherwise indicated.

3. Reapplication of Chemical Cleaners: Do not apply chemical cleaners to same masonry surfaces more than twice. If additional cleaning is required, use steam wash.

3.05 CRACK AND CORNER JOINT REPAIR (Non-movement cracks)

A. Inspect existing mortar joints for cracked, defective, open, and/or deteriorated mortar.

B. Rake out cracked, loose, or deteriorated mortar from joints to depths equal to 2-1/2 times their widths, but not less than 1-inch, nor less than that required to expose sound un-weathered mortar.

C. Remove mortar from masonry surfaces within raked-out joints to provide reveals with square backs and to expose masonry for contact with new sealant. Brush, vacuum, or flush joints with water to remove dirt and loose debris.

D. Do not spall edges of masonry units or widen joints.

E. Replace masonry units which are loose, damaged, or spalled.

F. Cut out old mortar by hand with chisel and mallet.

G. Power operated rotary hand saws and grinders will be permitted but only on specific written acceptance of Consultant based on submission by Contractor of satisfactory quality control program and demonstrated ability of operators to use tools without damage to masonry. Quality control program shall include provisions for supervising performance and preventing damage due to worker failure.

H. Fill prepared corner and step cracked joints with joint backing and sealant in accordance with Section 07920 - Sealants and Caulking. "Dust" wet sealant with matching color sand or crushed masonry fines to match adjacent surfaces.

I. Fill remaining prepared joints with repair mortar. Remove excess water from joint surfaces so that surfaces are surface dry at time of mortar application.

3.06 BRICK REMOVAL AND REBUILDING

A. Masonry Removal:

1. Carefully remove by hand, masonry which are damaged, spalled, or deteriorated. Cut out full units from joint to joint in manner to permit replacement with full size units.

2. Support and protect masonry to remain that surrounds removal area.

3. Salvage as many whole, undamaged masonry units as possible.

4. Remove mortar, loose particles, and soil from salvaged masonry units by cleaning with brushes and water. Store salvaged masonry units for reuse.

5. Clean remaining masonry units at edges of removal areas by removing mortar, dust, and loose debris in preparation for rebuilding.

B. Masonry Rebuilding:

1. Install new or salvaged masonry units to replace removed masonry units. Fit replacement units into existing bonding and coursing pattern. If cutting is required, use motor driven saw designed to cut masonry with clean, sharp un-chipped edges.

2. Lay replacement masonry units with filled bed, head, and collar joints. Butter ends with sufficient mortar to fill head joints and shove into place. Wet clay brick which have ASTM C 67 initial rates of absorption (suction) of more than 30 grams per 30 square inches per minute. Use wetting methods that ensure

units are nearly saturated but surface dry when laid. Maintain joint width for replacement units to match existing.

3. Tool exposed mortar joints in repaired areas to match joints of surrounding existing masonry.

4. Repoint new mortar joints in repaired area to comply with requirements for repointing existing masonry, except rake out joints before mortar sets.

3.07 REPOINTING EXISTING MASONRY

A. Joint Raking:

1. Rake out mortar from joints to depths equal to 2-1/2 times their widths but not less than 1-inch (25mm) nor less than that required to expose sound, unweathered mortar. Blow clean and install urethane sealant within 1/2-inch (13mm) of face.

2. Remove mortar from masonry surfaces within raked-out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.

3. Do not spall edges of masonry units or widen joints. Replace masonry units that become damaged.

4. Cut out old mortar by hand with chisel and mallet.

5. Power operated rotary hand saws and grinders will be permitted but only on specific written acceptance of Consultant based on submission by Contractor of satisfactory quality control program and demonstrated ability of operators to use tools without damage to masonry. Quality control program shall include provisions for supervising performance and preventing damage due to worker failure.

B. Joint Pointing:

1. Rinse masonry joint surfaces with water to remove dust and mortar particles. Time application of rinsing so that, at time of pointing, excess water has evaporated or run off and joint surfaces are dry and able to receive sealant application.

2. Apply first layer of pointing mortar to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8-inch (9mm) until uniform depth is formed. Compact each layer thoroughly and

allow to become thumbprint-hard before applying next layer.

3. After joints have been filled to uniform depth, place remaining pointing mortar in three layers with each of first and second layers filling approximately 2/5 of joint depth and third layer the remaining 1/5. Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing masonry units have rounded edges, recess final layer slightly from face. Take care not to spread mortar over edges onto exposed masonry surfaces or to featheredge mortar.

4. When mortar is thumbprint hard, tool joints to match original appearance of joints. Remove excess mortar from edge of joint by brushing.

5. Cure mortar by maintaining in damp condition for not less than seventy-two hours.

6. Where repointing work precedes cleaning of existing masonry, allow mortar to harden not less than thirty days before beginning cleaning work.

7. Where mortar joints have step cracked due to lack of control joints and where sealant is applied over these cracks, cut mortar joint to depth of 1-inch deep and fill with two component urethane sealant to depth of 1/2-inch . Allow to cure and finish off tuck-pointing with mortar at depth of 1/2-inch.

3.08 FINAL CLEANING

A. Thoroughly clean exposed masonry surfaces of excess mortar, sealant, and foreign matter using stiff nylon or bristle brushes and clean water, spray applied at low pressure.

B. Use of metal scrapers or brushes will not be permitted.

C. Use of acid or alkali cleaning agents will not be permitted.

3.09 CLEAN UP

A. Remove all masking and protection materials upon completion.

B. Keep adjacent surfaces clean during the installation progresses.

END OF SECTION